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ABSTRACT

Project COULD (Career Orientation Utilizing Language Development) was developed as a means of building skills, knowledges, and attitudes on elementary children's previously acquired backgrounds. Children begin to speak the grammar and vocabulary characteristic of the language heard most frequently at home and in the immediate environment. A series of units of instruction were developed from the concepts and vocabulary of the industries indigenous to Coos County (Oregon). Each unit of the instructional guide is designed to promote vocational awareness, exploration, and language development. Intended for fourth grade use, the four-week unit on harvesting shellfish focuses on the harvesting process, terminology, key occupations, and environmental influences. It is divided into eight sections: (1) a summary; (2) a unit outline; (3) project goals; (4) unit performance objectives; (5) vocabulary; (6) suggested learning activities (games, puzzles, and evaluation and followup activities); (7) lists of resource persons and materials (audiovisual and print media) and outlines for use by the resource person (suggestions, discussion topics, and related vocabulary); and (8) background information (suggested teacher reading; job and process flow charts for crab, shrimp, and oyster fishing; and job descriptions for 17 shellfish industry-related occupations). (Author/BP)

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CAREER ORIENTATION UTILIZING LANGUAGE DEVELOPMENT
CE 006 800

PROJECT COULD

AN ESEA, TITLE III PROJECT SERVING COOS COUNTY, OREGON

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F #2
HARVESTING SHELLFISH
GPADE 4

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PROJECT COULD

CAREER ORIENTATION UTILIZING LANGUAGE DEVELOPMENT

A PACE PROJECT

Elementary and Secondary Education Act of 1965

Project COULD was developed as a means of building skills, knowledges, and attitudes upon elementary children's previously acquired backgrounds. Children learn to speak the grammar and vocabulary characteristic of the language heard most frequently at home and in the immediate environment.

A series of units of instruction were developed from the concepts and vocabulary of the industries indigenous to Coos County. The intention was to promote vocational awareness, exploration, and language development for the students in grades 3 to 8.

The information in this unit was prepared for use at the third grade level for an approximate period of four weeks.

Materials prepared by Project COULD are available from the IMC of Coos County Intermediate Education District, 2405 Colorado Street, North Bend, Oregon 97459.

SCHEDULE OF UNITS

Grade Level	Fishing
Grade 3 Unit F #1	Harvesting Fish
Grade 4 Unit F #2	Harvesting Shellfish
Grade 5 Unit F #3	Seafood Processing
Grade 6 Unit F #4	Marketing Fish
Grade 7 Unit F #5	Fishing Ecology
Grade 8 Unit F #6	Coos County Careers in Fishing

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SUMMARY

This instructional guide is divided into eight sections. Each section is tabulated for easier use and quick reference.

Summary:

The intentions and reasoning for this program have been stated. For effective results, it is suggested that the teacher becomes totally familiar with the curriculum guide before beginning.

Outline:

This section gives an overall view of all of the sequenced units. Details of the information to be covered in this unit are specifically outlined.

Goals:

Objectives:

Activities:

These three sections are sequentially integrated to clearly define what activities are suggested for a particular objective and a particular goal. Each goal is numbered to correlate directly with objectives, activities and resources.

Vocabulary:

All terminology found in the unit, including particular occupations, is included in this section. Each term is defined. These definitions are intended for teacher use only.

Resources:

Locally produced material, Coos County resource people, books, pamphlets and commercially prepared media are listed with reference made to activity correlation.

Background:

This section contains additional material for teacher use.

HARVESTING SHELLFISH
UNIT F #2 OVERVIEW

The following outline represents the scope of the entire set of units (grades 3-8) for the category of FISHING. Only the outline for this unit is in its completed form.

SUGGESTED TIME: FOUR WEEKS
- Shellfish Harvesting Process: 13 days
- Shellfish Harvesting Vocabulary: 5 days
- Shellfish Harvesting Occupations: 10 days
- Environmental Factors: 8 days
- Economic Influences of Shellfishing on the Economy: 1 day

(UNIT F #1) HARVESTING FISH

(UNIT F #2) HARVESTING SHELLFISH

A. Shellfish Harvesting Processes
   1. Crab
   2. Shrimp
   3. Oyster Farming

B. Shellfish Harvesting Terminology
   (See VOCABULARY section of this unit)

C. Key Occupations in the Shellfish Harvesting Industry
   1. Captain
   2. Deck Hand
   3. Carpenter
   4. Corker
   5. Electrician
   6. Laborer
   7. Laborer: Shipbuilding yard
   8. Machinist
   9. Painter
   10. Pipe fitter
   11. Oyster planter
   12. Purchasing agent
   13. Secretary/bookkeeper
   14. Stringer
   15. Welder/ship fitter
   16. Yard Foreman

D. Environmental Influences
   1. By the industry on the environment
   2. By the environment on the industry

E. Economic Influences of Shellfishing on the Economy

(UNIT F #3) SEAFOOD PROCESSING

(UNIT F #4) MARKETING

(UNIT F #5) ECOLOGY

(UNIT F #6) COOS COUNTY CAREERS

OUTLINE

GOALS

1. To make the students aware of the basic types of commercial shellfishing done in Coos County and the process and equipment involved in each.

2. To make the students aware that commercial shellfishermen use a unique set of terms that facilitate communication among the people working in the shellfishing industry.

3. To make the students aware that the shellfishing industry provides various opportunities for employment on a seasonal and full time basis.

4. To make the students aware of the environmental factors which influence and are influenced by the commercial shellfishing industry.

5. To make the students aware that the million dollar a year commercial shellfishing industry plays an integral part in the total economy of Coos County.

The intention of Project COULD units is to utilize the language arts areas of reading, writing, listening, and speaking as the vehicles to promote vocational awareness and exploration. It <u>is not</u> to dictate language arts curriculum, but to suggest that the vocational areas under consideration do have unique language and concepts.

It is assumed that the language development aspect of the activities will be commensurate with the on-going language arts programs of the students participating in the various units prepared by COULD.

PERFORMANCE OBJECTIVES

1. Given their choice of the three types of commercial shellfishing done in Coos County, the learners will:
   a. Select the shellfishing method he wishes to research
   b. Research the harvesting process
   c. Make an oral report to the class describing the process and each worker's job.

2. Given the crossword puzzle listing the vocabulary and key occupations as listed in the VOCABULARY section of this unit, the learner will complete the puzzle with at least 50% accuracy without the aid of resource materials.

3. Given three 5 x 8 inch index cards, the learner will write a riddle about at least three occupations in the shellfishing industry. The riddle will be placed on one side of the card and the answer on the other.

4. Given their choice of the three types of commercial shellfishing done in Coos County, the learners will:
   a. Select one shellfishing method
   b. List at least one way in which the shellfishing industry influences the environment.
   c. List at least one way in which the environment influences the shellfishing industry.

5. The learners will describe how the money spent by the shellfishermen helps others in the county:
   a. By providing other people with jobs
   b. By helping to pay their wages.

THE DEFINITIONS PROVIDED ARE INTENDED FOR TEACHER USE. IT IS SUGGESTED THAT THE STUDENTS FORMULATE THEIR OWN DEFINITIONS THROUGH THE ACTIVITIES OF THIS UNIT.

VOCABULARY AND SPELLING

In this unit, 43 vocabulary words and 14 key occupations are discussed. These words and occupations can and should be used as a part of the spelling program in the classroom. You as the teacher, are the best judge as to how this should be done in your classroom. No matter how you approach the matter, remember that it is just as important to know how to spell the word as it is to know how to use it correctly in speaking.

MASTER VOCABULARY LIST

A permanent listing of all current vocabulary words should be available to the students at all times during the study of fishing. Having this list of words and their definitions readily available to the children on charts, the overhead projector, the blackboard or a vocabulary notebook will provide the children with an immediate reference should the need arise. A professional in-depth type of definition will not be nearly as valuable to the children as one that they have written, discussed and put on the master list themselves. If a definition is to be useful, it must be easily understood by the children.

VOCABULARY

SHRIMP FISHING

BELLY	The center portion of the net behind the square* which is somewhat cone shaped. It lies between the square* and the cod end* of the net.
BLOCKS	A pully through which rope,cable or line is strung. Used to lift and guide the cable, rope or line to a desired location.
BOOM	A large pole or mast to which are attached ropes, blocks,* and other lines powered by winches* on the deck of the boat. The ropes can be swung out to lift nets from the water onto the deck of the boat.
COD END	The more pointed end of the cone shaped net where the shrimp are trapped. A lace type arrangement keeps the end of the net closed during trawling*. When the net is brought up on the deck, the lacing is undone and the shrimp and other fish fall out onto the deck.
FISH HOLD	The area below deck where the fish are stored.
INTERMEDIATE ROPE	The rope threaded around the circumference of the trawl net* just behind the square*. When the wings* have been wound onto the net reel*, a rope from the boom* is attached to the intermediate rope and the net is lifted up so that only the cod end* remains in the water.
NET REEL	The large drum around which the net is reeled aboard the shrimp trawler. Some are hydraulically powered, while others are mechanically or hand powered.
OTTER TRAWL DOORS	Used to force the wings* of the net apart, these solid metal or metal frame wooden plank doors will vary in size depending upon the power the boat has and the depth at which the fishing is to be done. The doors are attached to the net by a bridle composed of the ends of the head and foot ropes. Four chains are attached to one side of the end of the doors and these are attached to the trawl cables*.
SHRIMP BOX	A wooden box able to hold about 85 pounds of shrimp. Used on the boats to sort shrimp into and store them until unloading at the dock.
SHRIMP OTTER TRAWL OR SHRIMP DRAG NET	This net is a smaller sized version of the fish otter trawl net and has a smaller mesh net. The net is composed of

*defined within the VOCABULARY section.

four sections: the wings*, which stick out and are attached to the doors* by a bridle; the square* which is the section of the net directly behind the mouth; the belly* which is the section of the net behind the square*; and the cod end* which is the cone shaped end of the net, fastened together at the end and can be opened to let the fish drop out. As the doors are pulled through the water, they pull the wings* of the net outwards. The rope which runs from one door across the top of the net is called the head rope. This rope has cork floats on it to lift the upper "lip" of the net up. The rope which runs from one door across the bottom of the net open and roll across the ocean floor to keep the net from fouling. With the doors pulling the net outward, the head rope corks lift the top of the net and the leads on the foot rope pull the bottom of the net down. This makes a mouth, the opening at the front of the net. By increasing the speed of the trawl, the net can be raised to a more shallow depth. By slowing the speed of the trawl, the net will drop to a greater depth.

SPLITTING STRAP — A rope threaded through the circumference of the lower belly* of the net. When the splitting strap is attached to the winch* cable and winched up, it closes off the cod end* of the net from the belly* similar to a string placed around the center of a sock full of marbles.

SQUARE — The portion of the shrimp otter trawl net directly behind the mouth.

TRAWLING — Dragging a net through the water at various speeds while net fishing.

TRAWLING CABLES — Long cables that are attached to the trawling doors* at one end and the spools of the winch* on the boat. Used for pulling the net during trawling* and reeling in the net.

WINCH — Any power driven drum aboard the boat which is used to wind and unwind cable, rope or lines. These may be large enough to spool from 20 to 600 fathoms (120 to 3600 feet) of line.

WINGS — The flat-side portions of the net which help guide the fish into the mouth of the net. These wings* are attached by a bridle to the otter trawl doors*.

*defined within the VOCABULARY section.

CRAB FISHING

BAIT — Any of various types of fish or shellfish used to attract other fish or shellfish.

BAIT JAR — 1/2 pint glass jar with a lid with holes punched in it. Can also be a commercially made type of plastic or the home made type of a metal type box.

BOUY — A float made of various materials from styrofoam to aluminum. Used to mark the location of the crab pot*. Attached to the pot by a line.

CRAB POT — Two metal rings held together by spokes around the outside and covered with a wire mesh screen. They measure about 38" in diameter and are about 12" high. On opposite sides of the rings are tunnels* through which the crabs crawl into the pots in an attempt to reach the bait in the bait jars* which are suspended inside the pot about level with the tunnels*. Each tunnel* has a stainless steel V shaped trigger at the inner end of it so that the crab can crawl into the pot by pushing this trigger* out of the way, but is then trapped inside when the trigger* drops back in place. Weight: about 90 pounds. Cost: about $80 fully rigged with bouy, line, etc.

HATCH — The opening in the deck leading to the hold*. Also refers to the cover over the hold*.

HOLD — An opening below the deck used to store fish, crabs, etc.. Some ships have refrigerated holds.

RADAR — Radio detecting and ranging. A piece of electronic equipment which emits a radio beam which is bounced off of objects in its way. It tells the operator at what compass reading the object is from the boat and how far away it is. Composed of a scope, among other things.

TANKS — Metal tanks through which sea water is circulated and into which the crabs are placed after removal from the pots. The salt water keeps the crab alive on voyages of over two days and keeps the meat from spoiling.

TRIGGER — A stainless steel wire shaped in an inverted V hanging at the inner ends of each of the tunnels*. When the crab crawls into the pot he pushes the trigger out of the way. When he is in the pot, the trigger falls back into place over the entrance of the tunnel* trapping the crab.

*defined within the VOCABULARY Section.

TUNNEL	The two entries into the crab pot. At the end of the tunnel is the trigger* which prevents the crab from crawling back out.
LORAN	A type of radio which helps the captain locate his position while at sea. This radio gives a reading which can then be located on special Loran Charts helping the captain to know the exact location of his vessel in any type of weather.
RADIO DIRECTION FINDER	An electronic piece of equipment used to find the direction from which a radio message is being sent out. The circular antenna is turned until the S meter registers the highest strength. Then the operator looks at the compass below the antenna and takes a reading. This reading will show the direction from which the radio signal is coming. Used to locate other boats at sea and can be used to triangulate a position from two known commercial radio stations on shore.

OYSTER FARMING

CHART	Various maps of the coastline and/or ocean floor.
OYSTER BARGE	A large flat barge powered by a motor. It is on the deck of the barge that the boxes are stacked during and before harvesting.
PLANTING STICKS	Sticks about 1 inch square and 30 inches long in which 3 holes are drilled. Through these holes are run the wires that will string the spat* to the planting stick.
SPAT OR OYSTER SEED	Half of a fully grown oyster shell to which about 20 baby oysters have attached themselves. The shell usually has a hole drilled in the edge through which wire is strung to hold the seed to the planting stick.

BOATBUILDING

AKUM	(pronounced o-come) Hemp-type yarn which is forced into cracks between boards on a wooden boat to help make the boat waterproof.
ARC OR ELECTRICAL WELDER	A welding machine which uses electricity to weld two pieces of metal together.

*defined within the VOCABULARY section.

BLUE PRINT	A detailed drawing of the boat showing how the vessel is to be built; i.e., angles, materials, welding places, electrical systems, engine location, etc.
CEMENT	Any of various types of commercially prepared seam cement. Used to cover the cracks between boards where the akum has been placed.
CORKING IRONS	Metal tools used to pound and push the akum into the cracks between boards on a boat.
GRINDER	An air electrical powered circular sander used to grind metal smooth.
HYDRAULIC SYSTEM	A method of circulating oil fluid which causes different pieces of equipment to work. The fluid can be piped through hoses and does not have to be connected to the piece of equipment by large and roomy drive shafts.
LATHE	A machine used in metal work which will turn a piece of metal and shave off portions so that it is nearly perfectly round. Used in turning shafts.
OXYGEN ACETYLENE TORCH	A torch which uses oxygen and acetylene gases as fuel. Used to melt the welding rod to form a cementing substance between two pieces of metal.
PIPE FITTING	Placing all of the pipes in and through which will go the wiring, water and hydraulic systems*.
SAND BLASTING	Sand is forced through a hose and nozzle onto a painted surface. Used in place of hand or mechanical sanding in preparation for painting large and/or irregular surfaces.

*defined within the VOCABULARY SECTION.

KEY OCCUPATIONS

CAPTAIN	He is the boss aboard the vessel. He must know all there is about piloting the boat, the electronic equipment, the fishing gear and the best fishing grounds, taxes on commercial fishermen and be able to do all the jobs aboard the boat as well as or better than his workers.
CARPENTER	Reads the blueprints to find out what type of finish work is to be done to the interior of the deck house. Uses carpentry tools to construct the cabinets, bunks, and chart tables for the cabin. Installs these in the boat. May also do any remodeling that has to be done to the deck houses of older boats, such as enlarging the gally, or adding a bunk.
DECK HAND	This is the man who does most of the physical labor aboard the boat. He is responsible for helping the captain rig the gear at the beginning of the season, rigging the gear for fishing that day and taking in the gear at the end of the fishing trip. He is responsible for getting the caught fish on board properly. He also does any processing of the fish that is done aboard the boat as well as the sorting.
ELECTRICIAN	Reads the blueprints to find where the wiring must be placed in the new boat. He then wires the boat and installs all of the electronic equipment to be used aboard.
LABORER	May do any of various assigned jobs around the farm. Can use the clippers to cut the oysters from the planting sticks, load boxes onto and off of the barge, do clean up and help load oysters aboard the truck for delivery.
LABORER: SHIP BUILDING YARD	These workers may do anything from clean up to replacing one of the workers who works at another job and is ill for a time. Will work into an apprentice type job if he shows the willingness to learn the jobs at the yard.
MACHINIST	These men are responsible for making parts of the boat and/or adapting commercial pieces of machinery to fit a particular boat or piece of equipment. He may have to build parts for the throttle control or a winch plate. These men also install these parts as well as the motor, hydraulic systems, shaft and other equipment on the boat.
OYSTER PLANTER	May help load the boxes of laden planting sticks onto the barge and the loading of the boxes into the smaller boats at the beds. Pushes the planting sticks into the bottom of the bed.

PAINTER	Is responsible for painting any part of the new or old boat that must be painted. He must know a great deal about marine paints and painting technique.
PIPE FITTER	Places all the pipes in the new boat from a blueprint. Lays out all the pipes and makes all the couplings, joints and sleeves necessary to connect the pipes. May use plastic pipes because of ease of installation wherever possible.
PURCHASING AGENT SHIPYARD	Orders all materials needed in the boat building yard. Is responsible for checking the price of all materials that come into the yard and seeing that those materials not immediately used are stored in a place which is easily accessible to the worker when he needs that part. Makes bids on the materials needed to build new boats and uses price books to look up the prices on all materials.
SECRETARY-BOOKKEEPER	Answers the phone and types any letters that have to go out. May make copies of papers to be duplicated on various copy machines and takes care of any mail that comes into the yard. Makes out bills to send to customers and sees that bills for purchased materials are paid. Also makes out payroll for the workers at the yard.
STRINGER	Strings the spat to the planting stick three shells per stick by placing a wire through the hole in the shell and the stick.
WELDER AND SHIP FITTER	The men who work at these jobs are responsible for reading the blueprints and making patterns from them. They must cut out the metal parts and tack them together. The finish welders take these parts and assemble them into larger components which form the boat. The specialty welder must have a certain amount of artistic ability to make the more specialized parts on the boat. These parts may be made of stainless steel or other exotic metals.

RESOURCE PEOPLE LISTED IN THE RESOURCE SECTION OF THIS UNIT SHOULD BE CONTACTED AT LEAST ONE WEEK IN ADVANCE OF THEIR VISIT. THEY SHOULD HAVE AVAILABLE AN OUTLINE OF THE MATERIAL YOU WISH COVERED AND A LIST OF ANY EQUIPMENT YOU WOULD LIKE THEM TO BRING. IF ONE OF THE CHILDREN'S FATHERS COULD BE USED AS A RESOURCE PERSON, THIS MAY BE BENEFICIAL TO THAT STUDENT AND THE CLASS AS A WHOLE.

THE TEACHER WILL NEED TO BRING THE FOLLOWING EQUIPMENT FOR USE IN THE UNIT:

SEVERAL PACKAGES OF 5 X 8 INCH INDEX CARDS

TWO DIFFERENT COLORED FELT TIP MARKERS

SEVERAL SHEETS OF TAG BOARD

ART SUPPLIES SUCH AS TEMPERA, VARNISH, SPARKLE, ETC.

SOME OF THE ENRICHMENT ACTIVITIES SUGGEST THAT THE CHILDREN RENT CRAB RINGS, BUY BAIT OR GATHER OYSTER SHELLS. AS THESE THINGS WILL ENTAIL SPENDING SOME MONEY, THEY SHOULD BE CLEARED WITH THE PRINCIPAL OF THE BUILDING BEFORE GOING AHEAD WITH THE ACTIVITY. BEFORE ANY OF THESE THINGS ARE DONE, CHECK WITH YOUR STUDENTS' PARENTS TO SEE IF THEY CAN SUPPLY SOME OF THE NECESSARY MATERIALS.

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1st Week	1-A 1-B	1-B	1-C 1-D 1-E 2-A 4-A 1-F	1-F 1-H 1-I 3-E 4-B	1-F 1-K 1-L 1-M 3-E 4-B
2nd Week	1-J 3-E 4-B	1-F 2-C	1-N 3-E 4-B	1-F 1-O 1-P 1-Q	1-F 2-B
3rd Week	1-R 3-E 4-B	3-A 3-B 3-C 3-D 3-E	3-F 1-11 (Test for Obj. 1)	3-H 3-E 4-B	3-F or 3-G 2-D
4th Week	1-F 2-E	1-S 2-F 4-B	1-S 2-F 4-B	2-G (Test for obj. 2)	4-C 4-D 4-E 4-F
5th Week	5-A 5-B 5-C	3-I (Test for Obj. 3)	1-T	4-G(Test for obj. 4)	5-D (Test for Obj. 5)

The numbers on the calendar refer to activities on the following pages, which parallel objectives and goals. These <u>suggested</u> activities which the instructor is free to modify and/or improvise are <u>suggestions</u> only.

1-A Begin this unit with a class discussion about fishing and shellfish by asking questions such as the following:
NOTE: The following questions are not meant to be answered completely but are to help the teacher assess the children's knowledge of the industry.
How many of you have ever been fishing? Ask for a show of hands.
What did you fish for?
Have any of you ever fished for shellfish? (If the children do not know what a shellfish is, allow them to look up the definition in a reference. Then write the definition on the chalkboard or overhead projector).
Ask the children to volunteer the names of some shellfish they know of and list them on the chalkboard or overhead projector.
How do fishermen fish for crab? Shrimp? Oysters? Explain. (At this point the teacher may wish to show the children the COULD produced study prints entitled Common Shellfish of Coos County.)

1-B ENRICHMENT ACTIVITY: Suggest to the students that they read the COULD produced pamphlet entitled What are Crab, Shrimp and Oysters? to learn more about the common shellfish caught or raised by commercial shellfishermen in Coos County. Refer to the following procedures and select the method you wish your children to use:

1. Accept volunteers to read aloud passages from the pamphlet.
2. Assign the pamphlet as silent reading and instruct the children to take notes on how to identify these shellfish and where they live.
3. Assign or allow the children to volunteer for small oral reading groups. Instruct the groups to be ready to discuss how to identify these shellfish and where they live.

After each of the above listed procedures, use questions such as the following for a class discussion:
Where does the crab live? The shrimp? The oysters?
How can we tell these shellfish apart?
What do the shellfish eat?
From what you know about where these shellfish live, what method would you use to catch them? Explain.
ALTERNATE ENRICHMENT ACTIVITY: Suggest to the class that they do some research to learn more about crab, shrimp and oysters. Assign or allow them to volunteer for one of three groups to research crab, oysters or shrimp. Discuss with the class what they think would be important information to know about these shellfish or use questions similar to those listed in Activity 1-B to direct their research efforts. Write these questions on the chalkboard or overhead projector, and allow the children time to copy them. Make sure the groups understand any other directions and any time limit set for this research.
Allow each group to report to the class and instruct the rest of the class to take notes on the presentations. After each presentation ask:
From what you know about where these shellfish live, what method would you use to catch them? Explain.

1-C Suggest to the children that they do some research into the ways in which oysters, shrimp and crabs are harvested. Appoint or allow the children to select the shellfish harvesting process they would like to research: crab, oyster or shrimp.

ALTERNATE ACTIVITY: If the teacher feels a total class study of each of the harvesting processes would be of more benefit to his class at this particular time, skip to Activity 1-G and omit those days allowed for research activities.

1-D ENRICHMENT ACTIVITY: Discussion of Research
Before the children begin their research, it would prove valuable to discuss with them any research technique you wish them to learn. Also at this point the librarian could present some lessons on use of the card file and any resource books in the library.

1-E ENRICHMENT ACTIVITY: The teacher may wish to instruct the children to make notebooks during their study of harvesting shellfish. The notebooks could include such things as any reports, notes, vocabulary words and definitions, any pictures the children may have drawn or cut from magazines and anything else the teacher or students wish to include. These notebooks could be displayed at the end of the unit for another class, PTA, or Open House.

1-F INDIVIDUAL AND GROUPS RESEARCH TIME: The teacher should move from group to group helping the children solve any problems which might arise and provide them with any art supplies they may need for pictures, murals, etc.

1-G Suggest that the children view the COULD produced media listed below to learn more about crab fishing:

16mm Sound Film:
Crab Fishing and Dragging for Shrimp
Study Prints:
Common Shellfish of Coos County
Farming Oysters

Instruct the children to take notes on the step-by-step harvesting process and select from the following procedures the one you wish your class to use to define the vocabulary words:

1. Write the words on the chalkboard or overhead projector. Assign one-half of the words to one-half the class and one-half to the other.
2. Allow students to volunteer to define the words written on the chalkboard or overhead projector. More than one student can volunteer to define a word. Instruct the students who have the same word to work together after the viewing and agree upon a definition to present to the class.
3. List the words on the chalkboard or overhead projector and instruct the children to define them as they view the media.

Vocabulary words to define for harvesting crab:

crab pot	bouy
tanks	bait jar
hold	bait
hatch	captain
trigger	deck hand

ALTERNATE ACTIVITY: View and discuss the IED 16mm sound film Crab Fisherman.

1-H View selected portions of the COULD produced media on harvesting crab: 16mm Sound Film: Crab Fishing and Dragging For Shrimp.

1-I FOLLOW UP: In a class discussion, define the vocabulary words. Then discuss the step by step crab harvesting process. Make a flow chart of this process or allow the children to make one, and mount it somewhere in the room for future reference.

1-J ENRICHMENT ACTIVITY: Suggest that the class visit a crab boat. Arrange for the field trip by contacting one of the people listed in RESOURCE section of this unit. Encourage the students to take their cameras and take pictures. Also, it would be profitable if the school has a portable tape recorder to teach one of the students to use the recorder and let him or her use it on the field trip.
FOLLOW UP: Review the field trip by discussing the step by step harvesting process and the vocabulary as listed in Activity 1-G.
ALTERNATE ENRICHMENT ACTIVITY: Suggest to the children that they invite a crab fisherman to come and talk to the class about harvesting crab. Ask questions such as the following to help the children prepare for the visit:
What things would our visitor like to know before he comes to our class? List.
Would it help our speaker to know something about us? Why?
What things might our visitor like to know about us before he comes to our class? List.
At this point, a discussion of proper use of the telephone could be inserted. A student should then be selected to call upon the resource person to arrange for the visit. If this does not fit into the children's curriculum, the teacher should call the resource person and arrange for the visit. Once the date has been set, the resource outline should be sent out to give the speaker some background information and time to collect any equipment he plans to bring to class for demonstration purposes.
NOTE: If the teacher has chosen to have the class do group research, the speaker can be invited to speak to only that group of students. Arrange for a meeting place where the group and speaker can work without being disturbed or disturbing others.
FOLLOW UP: Review the vocabulary and process covered by the resource speaker, defining any words on the chalkboard or overhead projector. Then, make a chart listing the step by step harvesting process. If the class already made a chart in Activity 1-I, review it and add any new harvesting information or vocabulary to it.
NOTE: Read Activity 1-N before proceeding.

1-K Suggest to the class that they view the media listed below to learn more about shrimp fishing:
16mm Sound Film: Crab Fishing and Dragging For Shrimp (Selected portion only).
Study Prints: Common Shellfish of Coos County

Instruct the children to take notes on the step by step harvesting process and select from the following procedures the one you wish your class to use to define the vocabulary words:

1. Write the words on the chalkboard or overhead projector. Assign one-half of the words to one-half the class and one-half to the other.
2. Allow students to volunteer to define the words written on the chalkboard or overhead projector. More than one student can volunteer to define a word. Instruct the students who have the word to work together after the viewing and agree upon a definition to present to the class.
3. List the words on the chalkboard or overhead projector and instruct the children to define them as they view the media.

Vocabulary words to define for harvesting shrimp:

shrimp otter trawl net	shrimp boxes
intermediate rope	fish hold
otter trawl doors	cod end
trawling	splitting strap
boom	wings
trawling cables	square
net reel	belly
winch	block

1-L View the selected media on harvesting shrimp:
16mm Sound Film: Crab Fishing and Dragging for Shrimp

1-M FOLLOW UP: In a class discussion, define the vocabulary words. Then discuss the step by step shrimp harvesting process. Make a flow chart of this process or allow the children to make one and mount it somewhere in the room for future reference.

1-N ENRICHMENT ACTIVITY: Suggest to the class that they invite a shrimp boat captain or deck hand to come and talk with them about harvesting shrimp. Review the questions and lists made in Activity 1-J Alternate Enrichment Activity, then invite the speaker to class. If the teacher wishes the speaker to view the media with the class and then present his talk, the media should be ordered well in advance of this activity.
FOLLOW UP: Review the vocabulary and process covered by the resource speaker defining any words on the chalkboard or overhead projector. If the class has already made a chart in Activity 1-M, review it and add any new harvesting information or vocabulary.

1-O Suggest that the children view the COULD produced media listed below to learn more about oyster harvesting:
Pamphlet: What are Crab, Shrimp and Oysters?
Study Prints: Farming Oysters
Instruct the children to take notes on the step by step process and define the following vocabulary words. Place the words on the chalkboard or overhead projector for easy reference.

Vocabulary words to define for harvesting oysters:

oyster barge	laborer
planting sticks	planter
oyster seed or spat	stringer

1-P View the selected COULD produced media on farming oysters:
Study prints: Farming Oysters

1-Q FOLLOW UP: In a class discussion, allow the children to volunteer definitions for the vocabulary words. Then discuss the step by step oyster farm. Arrange for the field trip by contacting one of the people listed in the RESOURCE section of this unit. Encourage the students to take their cameras and take pictures. Also it would be profitable, if the school has a portable tape recorder, to teach one of the students to use the recorder and let him or her use it on the field trip.
FOLLOW UP: Review the field trip by discussing the step by step oyster farming process and the vocabulary as listed in Activity 1-O.
ART PROJECT: While at the oyster farm, the children may wish to ask for oyster shells which can be used for art projects such as those listed below:

1. Coat the outside of the clean shell with laquer or shellac, leaving the inside unfinished. This makes an attractive ash tray or jewelry container. Sparkle can be shaken over the damp finish to add color if desired.
2. Allow the children to experiment with pipe cleaners, buttons, nails and tacks, straws and wires in creating an animal using shells for the body, head, feet, etc.
3. Let each child print his name inside the shell with acetate ink, oil base paint or crayon. Mold a base of clay and mount the shell to form an attractive desk name tag.
4. Glue colored beads around the edge of the shell and make legs with the beads and form an attractive "knick-knack".
5. Cut out small pictures from magazines which will fit inside the shell. Glue the picture in the shell and varnish or shellac the entire shell. With a small drill, drill holes in the shell and make a class mobile, using small sections of coat hanger and string with which to attach the shells.

1-S Allow each group to report to the class the process involved in harvesting that particular shellfish. Allow time for the class to ask questions and discuss the reports.

1-T ENRICHMENT ACTIVITY: FIELD TRIP
As a culmination to this unit, the teacher may wish to make arrangements for the class to do some sport crab fishing. Crab rings can be rented and bait purchased from Hanson's Landing in Charleston, or a quick check with the children may yield parents who have crab rings and would be willing to serve as "experts" on fishing, cooking and picking crab. Check the RESOURCE section in this unit for other people who can help on this field trip. Bring the crabs back to school for preparation and eating.

1-U EVALUATION ACTIVITY (Test for Goal and Objective 1)
The learners will describe how the money spent by the shellfishermen helps others in the county:
a. By providing other people with jobs
b. By helping to pay their wages

2-A Hand out a copy of the vocabulary words and key occupations as listed in the VOCABULARY section of this unit. Instruct the children to define these words as they come upon them during research, films, reports, etc.

2-B ENRICHMENT ACTIVITY: GAME WORD DOWN

Teacher Preparation----None

Objectives----------The object of this game is to see which team, at the end of the game, has the most members still standing.

Procedures----------Divide the class into two equal teams. Each team stands in a line facing the other on opposite sides of the room. A word or definition is given orally by the teacher to the student at the head of the line of first one team and then the other. If the correct answer is given, a word or definition is given to the first person in line on the other team. The next set of questions would be given to the second people in each line and so on until the end of the line is reached.

Rules----------If the player being questioned gives the correct response, he remains standing. If the response is incorrect, he must sit down. If neither player gives the correct response, both must sit down and someone already sitting is given a chance to answer. If he is correct, he rejoins his team at the end of the line.

2-C ENRICHMENT ACTIVITY: GAME COLLEGE BOWL

Teacher Preparation----Make two different colored sets of all vocabulary words to be defined on 5" x 8" cards, one word to a card.

Objectives----------To see which team, at the end of the game, has the most points.

Procedures----------Divide the class into two teams. Hand out the word cards, one color for each team, one card at a time to each student until all cards are gone. Give a definition orally to the class. If a student has the card with the correct word on it, he may answer the question. If he thinks he has the right card, he may also answer.

Rules----------To be able to answer, the student with the card must stand up and say "CALL!" In this way the teacher sees and/or hears the first person to stand on each team. If the answer given by the first person to stand and say "CALL!" is correct, his team gets the point. If he misses the question, the first person who called on "CALL!" on the other team gets a chance to answer. If he is correct, his team gets the point. If both players give incorrect answers, the definition is given again later on in the game.

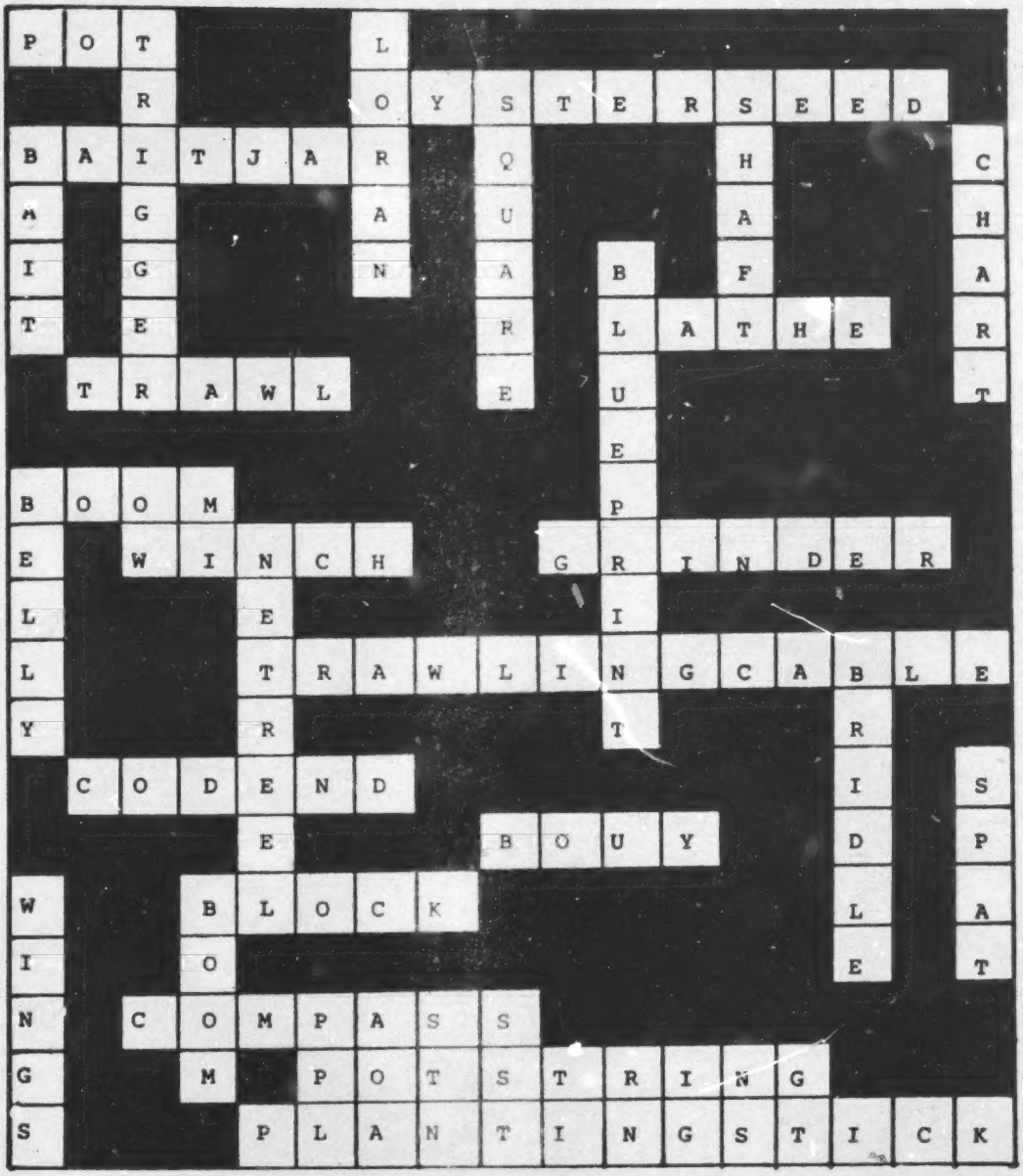
2-D ENRICHMENT ACTIVITY: GAME: WORD POWER

Teacher Preparation----None
Objectives----------The object of this game is to see who, during the period of the game, can remain standing the longest. This person may be assigned the honorary title of Captain because he knows so much about the shell-fishing industry.
Procedures----------One student stands next to the desk of another. The teacher gives a vocabulary definition aloud. The first student to answer with the correct word gets to move on to stand by another person and attempt to answer another question. If the person who is standing does not answer the question correctly, he takes the seat, and the person he was standing by then stands. If neither can give the correct term, the definition is kept and used at a later time.
Rules----------In case of a tie, another definition must be given. Two students may not be standing at one time. The first answer must be the correct one, or both players sit and the next person in that row of seats stands.

2-E Before the groups make their oral presentation they should select from the methods listed below the one which they wish to use to present the vocabulary to the rest of the class. Write the list on the chalkboard or overhead projector and allow each group to choose a method:
1. Provide the group with a ditto master on which to write the words and their definitions. Ditto enough copies for each class member before the report.
2. Have the group write the words on the chalkboard or overhead projector and add the definitions during the report.
3. Instruct the group to place the vocabulary words and their definitions on pieces of tagboard. As the word appears in the report, the tagboard may be set in the chalk tray or taped to the chalkboard.

2-F ENRICHMENT ACTIVITY: As each oral report is presented, allow time for the class to take notes and define the vocabulary words which are to be placed in their notebooks. (See Activity 1-E)

2-G EVALUATION ACTIVITY (Test for Goal and Objective 2)
Hand out the crossword puzzle to each member of the class. Read the directions aloud to the class or select a student to do the reading and instruct the class to read along silently. Be sure the students understand the directions and any time limit to be observed before instructing them to begin work. (The crossword puzzle will be found on the following pages. The blank puzzle may be removed and copied).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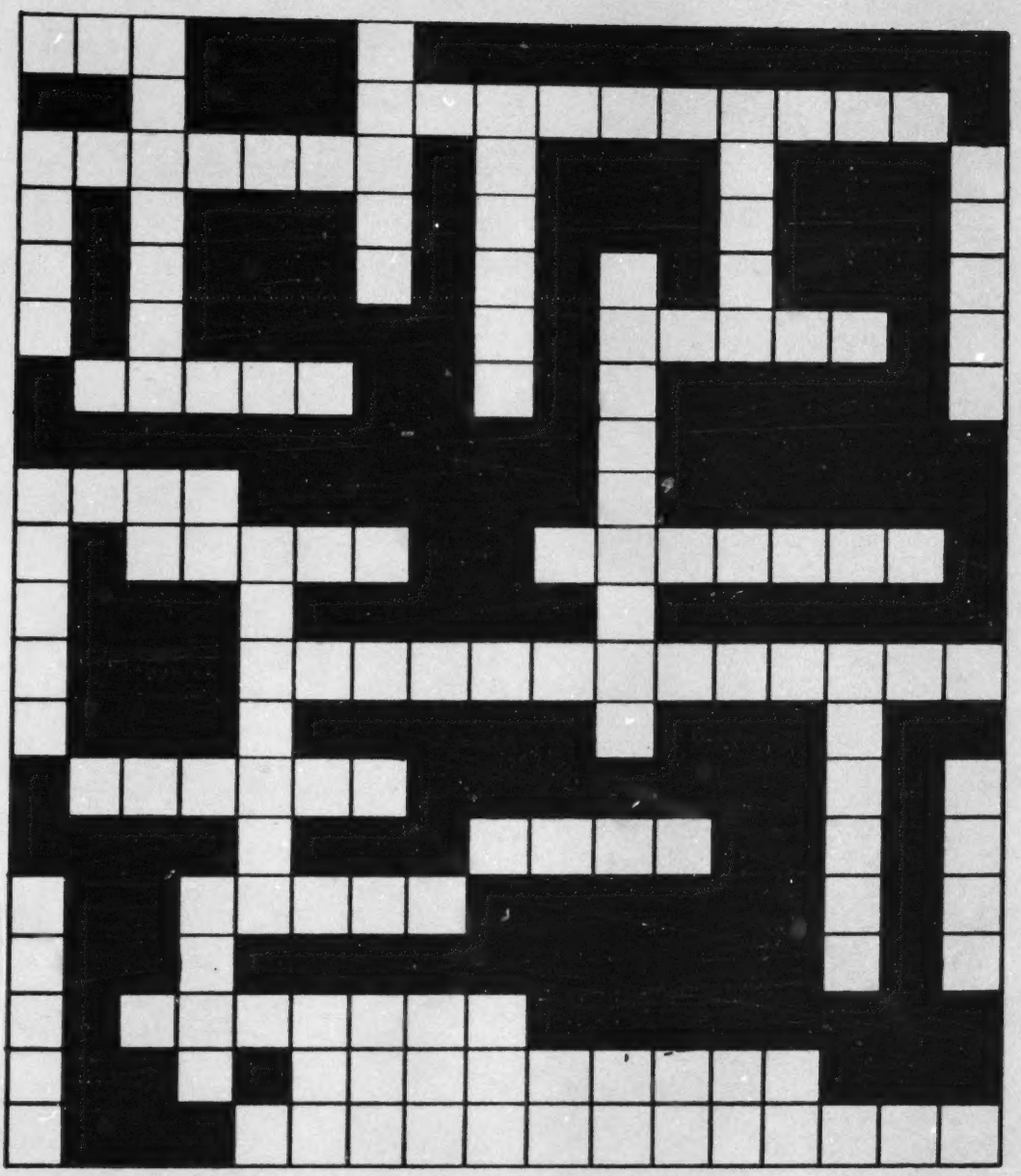

DIRECTIONS: Fill in the crossword puzzle from the list of words below. Cross out each word in the list as you use it. Do this puzzle in pencil.

pot	wings
oyster seed	planting stick
trawl	boom
compass	otter trawl cable
trigger	blueprint
shaft	pot string
bait jar	chart
belly	bridle
boom	bouy
grinder	bait
Loran	spat
lathe	block
winch	square
cod end	net reel

ACROSS

1. The piece of equipment used to catch crab.
2. 20 baby oysters on an oyster shell.
3. Crab bait is put in this.
4. A machine which turns and grinds metal shafts almost perfectly round.
5. To drag a net through the water with a boat.
6. A large pole on a ship to which blocks with ropes through them are attached.
7. A machine used to haul in or let out rope, line or cable.
8. A machine which grinds metal smooth.
9. The cable which attaches the shrimp otter trawl net to the boat.
10. The cone shaped end of the shrimp otter trawl net. It is laced closed.
11. The float which is attached to the line leading to the crab pot. It tells the fishermen where crab pots are located.
12. A pulley through which a rope, line or cable is run.
13. An instrument which tells direction. Made up of a compass and a direction card.
14. A number of crab pots laid out in a straight line.
15. The stick to which oyster seed is wired.

DOWN

1. The wire which keeps the crab from crawling out of the crab pot.
2. The electronic radio which gives two numbers that can be located on a chart. These numbers and the chart help the Captain find the exact location of his boat.
3. A fish or part of a fish used to attract crabs and fish.
4. The part of the shrimp otter trawl net behind the mouth.
5. The long rod which connects the motor to the propeller on a boat.
6. The middle part of the shrimp otter trawl net directly between the square and the cod end.
7. A map of the ocean and nearby land used by the Captain to help find the location of the boat.
8. The large drawing of the boat and all its parts. Used by boatbuilders to read how the boat is to be built.
9. The large drum around which the shrimp otter trawl net is wound.
10. The ropes which attach the shrimp otter trawl net to the otter trawl doors. Made up of the head and foot ropes.
11. The sides of the shrimp otter trawl net which help guide the fish into the net.
12. Same word as 6 Across.
13. Another name for oyster seed.

3-A In a class discussion, ask questions such as the following to help the children begin thinking about service occupations involved in the fishing industry:
When a commercial fishing boat needs a lot of repairs, where does the captain take his boat?
If the captain decides to buy a new boat, where would he go to buy just the boat he wants?
Do you think the places that sell new boats might also make repairs on old ones? Why or why not?
What jobs might workers have at a place which sells or repairs commercial fishing boats? List.

3-B Suggest to the class that they view the COULD produced media to learn more about jobs at the boatbuilding company.
Study Prints: Jobs At The Boatbuilding Company
Instruct the children to list the names of all the workers they see in the presentation and a short summary of their jobs. Place the following vocabulary words on the chalkboard and allow the children to volunteer to define three of the words:

pipe fitting	sand blasting
corking irons	blueprints
akum	oxygen acetylene torch
cement	arc or electrical welder
shaft	grinder
hydraulic system	lathe

3-C View the COULD produced media on jobs in the boatbuilding industry:
Study Prints: Jobs At The Boatbuilding Company

3-D FOLLOW UP: Allow those children with the same word to define the vocabulary on the chalkboard or overhead projector. Then accept volunteers to list the occupations seen in the presentation and a short job description of each. Write the occupations and descriptions on the chalkboard or overhead projector or on pieces of tagboard (in preparation for Activity 3-F).

3-E In a class discussion, as part of the follow up after a media presentation, field trip or resource speaker's visit, have the children volunteer the names of the workers they have seen or heard and provide a short summary of their jobs. Write these occupation titles and descriptions on the chalkboard or overhead projector or on pieces of tagboard (in preparation for Activity 3-F).

3-F ENRICHMENT ACTIVITY: GAME: ARRANGEMENT

Teacher Preparation----The teacher should make up cards or strips of railroad board with the occupation title on one side and the job description on the other.

Objectives----------For the player to arrange the people holding the occupation title card so they are standing under the correct job description. The winning player gets a point for his team.

Procedures----------The students select teams or the teacher can appoint them. The teacher then tapes three or more job description cards to the board for team A and B. Holders from Team A are given the corresponding occupation title cards and allowed to stand under the job description title cards for Team B and vice versa, making sure they are mixed up. An arranger is then selected from each team. He goes to the board and at the "go" signal moves the holders under the correct job description cards. The first arranger to arrange the holder's under the correct job description card wins a point for his team. When he is finished, he must say "CALL".

Rules----------The holders trying to stump the arranger from the other team may stand under any job description card, even under the correct one. Arrangers must not begin until the "go" signal is given. When an arranger says "CALL" he must not do any further arranging. If he is wrong, wait for the other arranger to finish. If both are wrong, select two new arrangers, more holders and place new job description cards on the board. One point is given for a correct arrangement of all words and definitions.
NOTE: Set a time limit for arranging if you feel it necessary).

3-G ENRICHMENT ACTIVITY: GAME: CHARADES

Teacher Preparation----Place the key occupations on small pieces of paper and place them into a container.

Objectives----------For the actor on one team to pantomime the job well enough that his partner or partners can guess the occupation title and say it. The team which guesses their member's occupation first wins the point. A wrong guess is a point for the other team. Occupations are then returned to the container and different team people draw.

Rules----------After one actor from each t[illegible] draws his occupation, he has 30 seconds to plan the pantomime. Both actors perform for their teams at the same time. The team who guesses the occupation first, gets the point. No words can be spoken by the actors. If this is done, that team automatically loses the game and the other team gets the point. The teams are allowed only one

guess at the occupational title, so they should watch the actor closely. Set a minute or less time limit for the pantomime depending upon the group.

3-H ENRICHMENT ACTIVITY: FIELD TRIP

The children might enjoy visiting one of the three boatbuilding companies in Coos County. Contact the proper resource person to arrange for a tour of their facilities. If the school has a tape recorder, teach one of the students how to operate it and let him or her take it along to record the guide on the field trip. The teacher should also encourage the children to bring their cameras to record the field trip. The pictures can be mounted or the slides arranged, scripted and used at PTA meetings, open house, or displayed in the hall for other classes' viewing.
FOLLOW UP: Discuss with the class the jobs at the boatbuilding yard by accepting volunteers to name an occupation title and describe the work done on that job. List on the chalkboard or overhead projector. As vocabulary words are brought up, ask for a volunteer to define them.

3-I EVALUATION ACTIVITY (Test for Goal and Objective 3)

Ask the children questions such as the following to help them begin thinking about riddles:
How many of you have ever heard of a riddle? (Allow the children to tell riddles they know and let the class guess the answers).
See if you can guess the answer to the following riddles: (Ask these or some of your favorite riddles).
I am a person who drives large groups of students to school. Who am I? (Bus driver)
I bring milk to your house each morning. Who am I? (Milkman).
I remove fish from the shrimp otter trawl net. Who am I? (Deck hand).
Others?
As soon as the class has the idea, suggest that they try to write one or more riddles for each of the following occupation titles:

Captain
Oyster Planter

When the children have completed the class riddles, hand out at least three 5"x8" index cards to each child. Instruct the students to select at least 3 occupation titles and write a riddle about each one. Place the riddle on one side of the card and the answer on the back.
When the students have finished, the teacher may wish to allow some of the children to read their riddles to the class and let the class guess the answer. The rest of the cards should be displayed on a bulletin board leaving space for the rest of the class to write their answers under the card.

4-A Ask the children questions such as the following to help them begin thinking about problems fishermen may have and their probable causes:
What problems might a fisherman have with his job? List.
What might cause this problem? List for each.
Suggest to the class that they make a chart and add to it as they discover more problems and their causes during the study of shellfishermen.

4-B As part of the follow up to each media presentation, resource speaker's visits and/or field trips, discuss as a class any problems that were presented and their cause and add them to the chart.

4-C Write the word "environment" on the chalkboard or overhead projector. Ask the class to define the word. If necessary, allow them to look up the definition in a reference book. Then ask the class which of the problems listed on the chart (from Activity 4-A) are caused by the environment. Star these and footnote the chart with the notation, "caused by the environment". Next ask which of the problems the fishermen could have,caused the environment to change in any way. Place an "X" by these and footnote the chart with the notation, "X" causes a change in the environment.

4-D Suggest that the class listen to the COULD produced audio tape recording entitled Mr. Fisherman and the Environment, with the purpose of adding any problems they may have ommitted to the chart. Instruct the children to take notes, listing the problems caused by the environment and those which cause a change in the environment. Instruct the children to list only those problems which are important in that portion of the shellfishing industry which they are researching; i.e., crabbing, oyster farming, dragging for shrimp.

4-E Listen to the COULD produced audio tape recording entitled Mr. Fisherman and the Environment.

4-F FOLLOW UP: In a class discussion, accept volunteers to add points to the chart. Ask the students to state whether this problem affects all three types of shellfish harvesting or only certain types. Encourage the students to explain their answers. Add any problems to the chart that were previously omitted and instruct the students to place their names on their papers and hand them in to the teacher.

4-G EVALUATION ACTIVITY (Test for Goal and Objective 4)
Given their choice of the three types of commercial shellfishing done in Coos County, the learners will
a. Select one shellfishing method.
b. List at least one way in which the shellfishing industry influences the environment.
c. List at least one way in which the environment influences the shellfishing industry.

5-A Hand out the COULD produced check list entitled The Fisherman Spends His Wages. Accept volunteers to read orally the reading and the instruction. When the teacher is sure the students understand the instructions and any time limit, allow the students to begin work.
ALTERNATE ACTIVITY: Hand out the COULD produced check list entitled The Fisherman Spends His Wages. Assign or let the children group themselves into workable units for oral reading and discussion groups. Instruct the students in the groups to share the oral readings and work together on the check list portion of the sheet. Be sure the students are aware of any time limit to be observed.
ALTERNATE ACTIVITY: Hand out the COULD produced check list entitled The Fisherman Spends His Wages. Instruct the children to read the material carefully and follow the directions. Be sure the students are aware of any time limit to be observed.
NOTE: The following check list may be removed from the unit and thermocopied to obtain copies for each student.

5-B In a class discussion, accept volunteers to tell things which a fisherman might buy from each of the businesses listed on the check list, and how the money spent would help the store owner and workers.

5-C Ask some of the students to volunteer to read their final conclusions for the class. Discuss these conclusions asking the class to decide if they fit all of the businesses or just a few. Ask the children to hand in their papers and evaluate their conclusions.

5-D EVALUATION ACTIVITY (Test for Goal and Objective 5): To make the students aware that the million dollar a year commercial shellfishing industry plays an integral part in the total economy of Coos County.

NAME_____

THE FISHERMAN SPENDS HIS MONEY

Shellfishermen in Coos County last year made around $1 million. Some of this money must be spent to pay for the fishing boat, boat repairs, equipment and the wages of the deck hands. Some money must be spent to pay taxes on fishermen's homes and property. What is left after these payments is what the fisherman has to spend on other things he needs or wants.

We call these things we must have to live, such as food, clothing, a place to live and medicine to keep us healthy, necessities. But the other things we don't really need are called luxuries. Some examples of luxuries might be a new car or a color television, an extension telephone, that vacation in Hawaii, or a summer trip to visit Aunt Mary and Uncle Jim. Most of us enjoy these luxuries and many more. So, to afford these necessities and luxuries, the fisherman goes to work so that he can earn money to spend.

But, did you ever think that the money that one person spends can help other people living in the area? To help discover how, read the following directions and complete the chart on the following page.

DIRECTIONS: Below you will find a list of businesses in Coos County where a fisherman might spend his money. In the space to the right of the name of the business, write one thing the fisherman might buy from this business. In the last column, explain how the money will help the business owner and workers in the business. Then complete the statement at the end of the chart.

BUSINESSES	NAME OF ONE THING THE FISHERMAN MIGHT BUY	HOW WOULD THIS HELP THE STORE OWNERS AND HIS WORKERS?
Gas Station		
Tire Store		
New Car Company		
Used Car Company		
Insurance Company		
Grocery Store		
Bakery		
Ice Cream Shop		
Cafe or Restaurant		
Furniture Store		
Clothing Store		
Discount Store		
Sport Shop		
Jewelry Store		
Sewing Store		
Toy Store		
Music Store		
Fish Market		
Fish Processing Plant		
New Boat Company		
Boat Repair Company		
Fishing Supply Store		
Art Supply Shop		

BUSINESSES	NAME OF ONE THING THE FISHERMAN MIGHT BUY	HOW WOULD THIS HELP THE STORE OWNER AND HIS WORKERS?
Skating Rink		
Swimming Pool		
Gun Shop		
Beauty Parlour		
Wig Shop		
Lawn and Garden Store		
Pet Shop		
Shoe Store		
Book Store		
Drug Store		
Nursery		
Florist Shop		
Stationery Store		
Auto Supply Store		
Lumber Company		
Paint Store		
Plumbing Store		
Carpet Shop		
Oil or Gas Company		
Electricity Company		
Milk Company		
Garbage Company		
Television Cable Company		

Read the column of the chart to yourself, then complete the following sentence:

The money the fisherman spends helps others in the county by_____

COULD PREPARED MATERIALS

	Activity No.
16mm Films:	
Crab Fishing and Dragging for Shrimp	1-G
	1-H
	1-K
	1-L
Study Prints:	
Common Shellfish of Coos County	1-A
	1-G
	1-K
Farming Oysters	1-G
	1-O
	1-P
Jobs at the Boatbuilding Company	3-B
	3-C
Printed Materials: Pamphlets:	
What Are Crab, Shrimp and Oysters?	1-B
	1-O
Audio Tape Recordings:	
Mr. Fisherman and the Environment	4-D
	4-E

RESOURCES

COMMERCIALLY PREPARED MATERIALS

Pamphlets:	Activity No.
Double-Rig Shrimp Trawling in the Gulf of Mexico United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, FL #470	1-F
A Long Line Crab Pot System, Agricultural Experiment Station, Oregon State University, Circular of Information #630, Corvallis, Oregon	1-F
Catching, Cleaning and Cooking Bay Crabs, Oregon State University Extension Service, Extension Circular #744, Corvallis, Oregon	1-F, T
Books:	
Nets Overboard: The Story of the Fishing Fleets, Jack Coggins, Dodd Mead and Co., New York, 1965. Coos Bay Library #YP639C.	1-F
A Guide to Fishing Boats and Their Gear, Carvel Blair Hall and Willits Dyer Ansel, Cornell Maritime Press, Inc., Cambridge, 1968. SWOCC Library #PAM 623.92	1-F
Commercial Fishing Gear of the United States, Wm. Dumont and G. T. Sundstrom, United States Fish and Wildlife Service, Washington, D.C., 1961. SWOCC Library #PAM 639.2	1-F
Of Ships and Fish and Fishermen, Dirk Gringhuis, Albert Whitman and Co., Chicago, 1963. Coos Bay Library #YP 333.9 G	1-F
16mm Sound Film:	
Crab Fisherman IED F2	1-G

RESOURCE SPEAKERS

The following people have consented to act as resource people. They should be contacted at least one week to a month in advance of their visit to give them time to prepare for their presentation and gather materials needed.*

NAME	OCCUPATION	PHONE NO.
Bill Arbus	Director: OMSI Marine Camp	---------
Buzz Taylor	Captain: Crab & Shrimp Boat	888-4142
Paul Heikala	All-Coast Fisherman's Association	888-5215
Larry Qualman	Qualman Oyster Farm	888-3145

For samples of the various shellfish being studied in this unit contact:

Tom Peterson	Co-Owner: Peterson's Seafood Co.	888-3251
Kerry Cox	Bandon Fisheries	347-2409
Larry Nelson	Manager: Eureka Fisheries	888-3248
Jerry Patrick	Manager: Bandon Fisheries	347-2409
Graydon Stinnett	Owner: Bandon Fisheries	347-2409

*Some parents of children in your classroom may be able to serve you as resource speakers. If this is the case, they should be contacted.

RESOURCE OUTLINE: CAPTAIN OF A COMMERCIAL CRAB BOAT

DATE OF VISIT_____

TIME OF VISIT_____

SCHOOL AND ADDRESS_____

SCHOOL PHONE_____

TEACHER_____

TEACHER'S HOME PHONE_____

A. If at all possible, the resource person should bring as much equipment used on the job as possible. The children will learn more about the equipment used and the job if they can see the gear. Equipment such as crab pot, a bouy, a crab measuring stick, and some pot line will help the children better visualize your job. A sample of the crab that you catch would prove interesting to the students. Feel free to bring any pictures of your work you may have.

B. Points to Discuss:
1. Why did you become a fisherman?
2. What are the minimum qualifications for your job: physical and educational?
3. What do you like most about your job?
4. What do you like least about your job?
5. What are the working conditions and hours?
6. What are the earnings?
7. How does the environment effect you and your job?
8. What effects do pollution and the foreign fleets have on the fishing?
9. Are there laws that you have to follow when fishing and piloting a boat? Explain.

C. Vocabulary words to cover with the children:
1. crab pot
2. tanks - used to keep crabs alive.
3. hold
4. hatch
5. trigger
6. tunnel
7. hydraulic power block
8. pot string
9. bouy
10. bait jar
11. bait
12. Loran
13. radar

RESOURCE OUTLINE: DRAGGING FOR SHRIMP

DATE OF VISIT_____

TIME OF VISIT_____

SCHOOL AND ADDRESS_____

SCHOOL PHONE_____

TEACHER_____

TEACHER'S HOME PHONE_____

A. If at all possible, the resource person should bring as much of the equipment used on the job as possible. The children will learn more about the equipment used and the job if they can see the gear. Equipment such as a sample of the shrimp otter trawl net, the floats, the leads, small pieces of the lines and cables that are used on board the boat and the type of rain gear you wear will help the children better visualize your job. Any pictures you have of your work, a sample of a shrimp, or any other things that you have that might help the children to better understand your job may be brought to the class.

B. Points to discuss:
1. Why did you become a fisherman?
2. What are the minimum qualifications for your job: physical and educational?
3. What do you like most about your job?
4. What do you like least about your job?
5. What are the working conditions and hours?
6. What are the earnings?
7. How does the environment effect you and your job?
8. What effects do pollution and the foreign fleets have on the fishing?
9. Are there any laws that you have to follow when fishing and piloting a boat? Explain.

C. Vocabulary words to cover with the children:
1. Shrimp otter trawl net
2. intermediate line or rope
3. otter trawl doors
4. trawling
5. trawling cables
6. net reel
7. winch
8. block
9. shrimp boxes
10. fish hold
11. cod end
12. splitting strap
13. wings
14. bridle
15. square
16. belly
17. captain
18. deck hand

WHERE TO LAY OUT CRAB POTS AT THE BEGINNING OF THE SEASON.

Crab boats out of Charleston usually fish between Cape Blanco in the south and the mouth of the Siuslaw River at Florence in the north. Crabs seem to move from season to season and there is no sure way to know exactly where the fishing is going to be the best. Once the pots are laid out, it would be too time consuming to pull them out and move them to a different location since most boats can only carry from 50 to 100 pots at a time and only take in 45 pots an hour in deep water. With the travel time to the location of the pot string, and laying out from 50 to 300 pots or taking them up, combined with the weather changes that occur frequently here, once they are laid out they are seldom moved to a new location any distance from the original. At the beginning of the season, crabs will be out as far as 45 fathoms (270 feet) of water, or about 2 1/2 - 3 miles off the coast. As the season progresses into summer, the crabs will move landward until at the end of the season they may be in as little as 4 - 8 fathoms (24 - 48 feet) of water and almost in the surf line where the breakers begin.

POT FISHERY
JOB AND PROCESS FLOW CHART

A. LAYOUT OF THE POT STRING

1. Anywhere from 2 1/2 to 3 miles off the coast at the beginning of the season in about 45 fathoms (270 feet) of water to almost within the surf line along the beach in 4 - 8 fathoms (24 - 48 feet) of water at the end of the season.
2. One deck hand places the bait in the bait jar and attaches it in the crab pot with rubber bands.
3. Both deck hands dump the pots overboard at a signal from the captain at 35 - 40 yard intervals.

B. PICK UP

1. Captain pilots the boat so that it approaches the pot string from the opposite direction of the current so that when the pot is raised, it will come up in front of the boat and not become tangled in the propeller.
2. One deck hand grabs the bouy and places the line between the sheaves on the hydraulic power block which assists in pulling the pot up. Throws the bouy back into the water. Line goes through the block and back into the water. Block is an inverted L boom which is swung outboard amidships so that it hangs out over the water.
3. Second deck hand places a fresh bait jar in the pot, secures it in place.
4. Both deck hands take the pot out of the water and remove the crabs onto the deck of the boat.
5. The second deck hand places a fresh bait jar in the pot and secures it in place.
6. The first deck hand throws the pot over at the signal from the Captain. The second deck hand meanwhile measures the crabs with a measuring stick and throws all females and any males under 6 1/4 inches (across the back from one side to the other) back into the ocean. (Females are usually smaller and have a wide flap on their bellies. The males are usually larger and have a thin flap.).

JOB AND PROCESS FLOW CHART
SHRIMP TRAWLING

1. The deck hands and the captain rig the boat for the trawling season:
   a. If a new net is needed, they may cut, weave and rig this new net.
   b. Check the drag cables to see if any need repair or replacing.
   c. Check the hydraulic winches on the cable spools and net spools (if they are used on the boat).
   d. If the net has been removed from the spools, the net will be re-wound on the spools starting with the wings.
   e. Check the cables and winches which operate the boom used to lift the cod end of the net from the water to the deck.
   f. Check the engines and refrigeration systems to see that they are running properly (if the boat has refrigeration).
   g. Buys food and other supplies necessary for the trip which can last up to three days in good weather.
   h. Buys ice if the boat has no refrigeration unit.

2. Captain pilots the boat out to the area to be fished using the electronic navigation aids, compass, and charts.

3. Setting the otter trawl net on a boat equipped with a net reel:
   a. On a boat with a reel around which the net is wound, the deck hands activate the winch to unspool the net off the stern of the boat.
   b. As the net goes out, he attaches the trawling cables to the chains on the otter doors.
   c. When the bridle end of the wings starts to come off the reel, the deck hand attaches the bridles to the doors. The doors are pulled overboard into the water by the weight of the net.

3.1 Setting the otter trawl net on a boat not equipped with a net reel:
   a. The deck hands attach the rope from the boom to the cod end of the net and use the winch to raise the net and swing it out over the water.
   b. The rope is then unhocked and the boom swung back over the deck where the process is repeated by the deck hand with another section of net.
   c. The deck hand attaches the bridles to the doors and uses the winch and boom to swing them over the side of the boat after attaching the trawling cables onto the door.

4. The deck hand activates the hydraulic winches which control the spools around which the trawling cables are wound. They unspool enough cable to let the net out the desired distance behind the boat and down to the desired depth.

5. Captain pilots the boat, watching the fathometer which shows the contour of the bottom. When a hill or wreck appears on the floor of the ocean, the captain steers the vessel around it or speeds up the boat to lift the net over the obstruction.

6. Depending upon the type of bottom and the type of fishing being done, the captain will trawl for from 1/2 to over 2 hours before he signals the deck hands to reel in the net

Today's commercial shellfisherman is very close to shellfishermen of the past in the method of harvesting used. But today's fisherman has a sleek boat with a powerful engine and a host of electronic gear on board to help him navigate safely and accurately. He no longer labors at the back breaking task of pulling pots or nets by hand. For today, hydraulic power is assisting him in his work from the bow of the boat to the stern. He is a new breed of independent businessman who earns his living in a very old way: fishing.

In this unit three harvesting processes and the jobs of the workers involved are examined; the harvesting of crab, shrimp and oysters. The first two harvesting processes require a sea going vessel and considerable equipment for the trips out over the continental shelf which extends 9 to 40 miles from the shore. In depths of up to 100 fathoms (600 ft) these shellfishermen make their living from the sea. However, the third harvesting process is just the opposite. It is carried on in the tideland beds which are only above the water at a minus tide and whose depth seldom exceeds 20 feet. It is in such a tideland area that the practice of oyster farming is carried on.

Unlike the other two commercial fishing processes, the oyster farmer does not have to depend upon nature to provide him with a large harvest. He orders the spat or oyster seed from a supplier and plants the numbers of oyster it will take to fill the orders from his customers. Rough seas and foreign fishing fleets have little effect on the oyster farmer. He is in a true sense part farmer and part fisherman.

It was an arbitrary decision to include in this unit the service occupation of boatbuilding, since it could also have been placed in Unit F#1 because it benefits the entire commercial fishing industry. Since boatbuilding is a very complicated process, as is boat repair, an actual study of the process involved has been omitted. Instead, only the individual occupations will be covered so that the students may become aware of this type of service and the jobs involved.

On the following pages are job and process explanations and flow charts, detailed job descriptions of the key occupations and a suggested reading list for the teacher. These materials will help give you a more complete background and help you to visualize where each job falls within the harvesting process.

TEACHER RESOURCES:

A Guide to Fishing Boats and Their Gear, Carvel Blair Hall and Willits Dyer Ansel, Cornell Maritime Press, Inc., Cambridge, 1968. SWOCC Library #623.82 B575

Commercial Fishing Gear of the United States, Wm. Dumont and G. T. Sundstrom, United States Fish and Wildlife Service, Washington, D.C., 1961. SWOCC Library #PAM 639.2

7. On a boat equipped with a net reel: The deck hands will activate the winches which reel in the trawling lines. When the doors come on board, the bridle is disconnected and the wings spooled onto the net reel at the stern of the boat.

7.1 On a boat not equipped with a net reel: The deck hands activate the winches which reel in the two trawling cables. When the doors are along side of the boat, the boom rope is used to haul them aboard.

8. As the belly of the net comes near the stern of the boat or along side, a cable from a boom is attached to the intermediate rope. The captain then turns the boat around so that the net hangs along side the boat. Then another boom rope is attached to the splitting strap and the net brought aboard to a position suspended over the deck.

9. The lace on the cod end of the net is pulled allowing the shrimp to drop to the deck.

10. The lace on the cod end is fastened again by the deck hand and the net swung out over the water and lowered.

11. On a boat equipped with a net reel: The deck hands activate the winch to unspool the net and as the wings come unwound, they are attached to the bridle.

11.1 On a boat not equipped with a net reel: Same as the process described in 3.1 a and b.

12. On a boat equipped with a net reel: The weight of the net pulls the doors overboard and the deck hands activate the winches to unspool the trawl cables.

12.1 On a boat not equipped with a net reel: The deck hands attach the boom cables to the doors and winch them overboard. If the doors are stored at the stern of the boat, the weight of the net will pull them overboard.

13. The deck hands sort through the shrimp removing any fish that have been caught in the net and throw what they do not want to keep away. The fish they wish to keep are placed in the fish hold and iced.

14. The shrimp are ready to be placed in boxes. The deck hand places crushed ice in the bottom of the shrimp box and then fills the box with about 100 pounds of shrimp. He places ice over the shrimp and uses a winch to lower the boxes into the hold of the boat.

15. The deck hand then washes down the deck of the boat with sea water and a hose.

16. Dragging for shrimp is usually only carried on during the daylight hours. Therefore, the boat can be back in port every evening.

17. The deck hands take turns cooking the meals that will be eaten while the boat is at sea.

18. At the fishery, the deck hands shovel the fish and ice into boxes which are hoisted from the fish hold to the docks.

19. When the boat is empty, the fish hold must be scrubbed down with detergent and water to destroy any bacteria left by the catch.

NOTE: Most shrimp drag boats carry a spare net. If the boat has net reels, many times the boat will have two reels, the one in use and the spare one. These spare nets are used in case the other becomes fouled and damaged in fishing. This facilitates continued fishing while the damaged net is being repaired.

PLANTING AND HARVESTING OYSTERS: JOB AND PROCESS EXPLANATION

1. Stringers take the oyster seed and planting sticks. Place wire through holes in the shell and planting stick thus wiring the seed to the stick, three shells per stick. Then they place the sticks in a box. When the box is full, they take it down to the water and set it in to keep the spat alive until low tide when it will be planted.

2. At low tide, the boxes are removed from the water by the planter and placed on the barge. The barge is then piloted to the oyster beds and the boxes loaded into the smaller boats.

3. These boats are rowed into the shallow water of the beds by the planters. The sticks are removed from the boxes and pushed into the mud.

4. When the oysters are matured, the boxes are again loaded on the barge and the barge piloted to the oyster beds. The boxes are loaded onto the smaller boats which are rowed into the beds by the laborer. He then pulls up the planting stick and lays them in the boxes in the boat. When the boxes are full, they are taken back to the barge and loaded with the aid of a power winch.

CAPTAIN

OCCUPATIONAL DESCRIPTION

Must know all about rigging the equipment of the boat and what equipment is needed. Must know how to navigate the boat in the sea using the electronic navigation aids and charts. Must know all about the running of the boat and be able to do minor repairs at sea including work in electronics, diesel mechanics, hydraulics, welding and carpentry. Must be able to read charts and maps telling of currents and bottom contours. Must be able to use the electronic equipment on board the vessel to find the depth of the water, the location of fish, the temperature of the water, and the engine indicators. Must know about taxes as they relate to the fisherman and his employees and be aware of the laws that regulate the commercial fisherman and his job. He must know about collective bargaining for better fish prices and know at what time of year the prices are best on a particular type of fish. In general the captain of a fishing boat must be a jack of all trades. Must also make up and repair any nets used in fishing.

EQUIPMENT

All the fishing equipment used on the boat, radar, Loran, radio direction finder, fathometer, compass, radio telephone, ship to shore phone, and citizen band radio.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements, although a course in boating and fishing law could help.

PHYSICAL DEMANDS AND WORKING CONDITIONS

Work is performed inside the pilot house of the boat and outside in the weather. The worker is subject to the hazards of being at sea and at the mercy of the weather, but with good judgment is in no immediate danger. The work requires above average strength and endurance as the work is not steady but will come in spurts as the fish bite. The captain may do everything that the deck hand must do if it is a small boat.

WORKER CHARACTERISTICS

Aptitudes: Must be able to pilot a boat at sea and have the necessary knowledge to read and use all of the navigation aids on the boat. Must like to work out in the weather and at least like the sea.

Temperament: Must be able to recognize the weather and know when it is time to quit fishing and come in or lay over for the night. Must be able to command the respect of his crew as well as their trust. Must be self reliant.

CARPENTER

OCCUPATIONAL DESCRIPTION

Read blueprints to find out what types of materials will be used to finish inside of the deck house with bunks, tables, cabinets, etc. Uses carpentry tools to make these fixtures and attaches them into place within the house. Must have some knowledge of electrical work welding and pipe fitting. May run the crane if necessary. May remove a damaged plank from the deck or hull, cut a new one to size and fasten it into place. May also modify the inside of the deck house to new specifications; i.e., add or remove a bunk, enlarge the galley, etc.

EQUIPMENT

Carpentry tools such as table or radial arm saws, sanders, skill and jig saws, hammer, level, square, etc. May use powder gun (a gun which uses blank 22 shells to drive fasteners through wood and steel).

MINIMUM QUALIFICATIONS

Education: No specific educational requirements. Any shop course in wood working and blueprint reading would be helpful.
Training: Shop courses can be helpful. Usually starts out as an apprentice carpenter and works way up to carpenter. From here he can specialize in cabinet and finish work. Math course through geometry would be helpful also.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed mostly inside the shop or in the deck house of the boat. The worker is subject to no immediate hazards. Must possess above average physical strength and endurance to handle large pieces of wood and cabinets and move them about the boat.

WORKER CHARACTERISTICS

Aptitudes: Must possess aptitude in motor coordination and eye-hand dexterity.
Temperament: Must be even tempered and capable of working without direct supervision.

CHANCES FOR PROMOTION

Could be promoted to carpenter foreman and then shop foreman if he shows a desire to learn and a willingness to work hard.

CORKER

OCCUPATIONAL DESCRIPTION

Uses corking irons and wedge to drive cotton and akum into seams, then puts in pitch and akum, and cements over the top of this, making the boat water tight.

EQUIPMENT

Corking irons, hammer, cotton, akum, pitch and cement.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements.
Training: On the job training.

PHYSICAL DEMANDS AND WORKING CONDITIONS

Most of the work is performed outside the boat in the weather. The worker is subject to no immediate hazards.Must possess average physical strength and endurance.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.
Temperament: Since the supply of these workers is so limited, his temperament does not seem to have as much effect as in a labor market where the workers are more numerous.

CHANCES FOR PROMOTION

This occupation is a dying art since more cement, steel, fiberglass and aluminum boats are now being built than wooden ones.

DECK HAND

OCCUPATIONAL DESCRIPTION

Must know how to rig all of the fishing equipment on the boat and help the captain change the rigging at the beginning of each new fishing season. Must run the hydraulic gurdies or winches to let out the equipment whether it be nets or lines. Must reel in the gear when fish are caught and remove the fish from the nets or lines. Will then sort the fish as to species and stow them in the hold after doing any gutting or other processing that is done for that species of fish in getting it ready to freeze. Will pack the fish in ice, or will place it in the hold so that it can be frozen. May help the captain do any minor repairs to the boat at sea and mend any nets that have been damaged. On a larger boat, he will do most of the actual fishing and freezing of the fish. (See job and process flow chart for each of the different types of fisheries in the BACKGROUND section of this unit).

EQUIPMENT

Gurdies and winches of various types, nets, lines, jigs, hooks, leaders, lead weights, boots, rain gear, fish knife, refrigeration machines, blocks, and gloves.

MINIMUM QUALIFICATIONS

Education: No specific requirements, although the employer prefers at least grammar school education.

Training: The worker will receive on the job training from the captain in the technique used aboard that boat during a particular fishing season.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is done mostly outside in the weather. It is fairly quiet and the worker is subject to hazards of working on a boat at sea. The worker needs above average physical strength and endurance because the work is not steady, but comes when the fish are biting. Must be able to handle the heavy equipment aboard the boat and the fish that are caught.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitudes in motor coordination, eye-hand-foot coordination and manual dexterity. Must enjoy working at sea and on the water.

Temperament: Must be able to work quickly and efficiently under conditions of stress due to the fish biting at a certain time and the amount of work that has to be done quickly at that time. Must be able to do work without direct supervision at times.

CHANCES FOR PROMOTION

May be promoted to captain as he gains experience.

ELECTRICIAN

OCCUPATIONAL DESCRIPTION

Reads blueprints to find how wiring must be placed in the boat. Places all electrical wires needed into the boat so that they run from the power source to the piece of electrical equipment, lights etc. Makes sure all wiring is properly placed and grounded. Wiring many times goes through pipes which are sealed to make them water proof. Installs all electrical equipment on boat.

EQUIPMENT

Wire cutters, soldering gun, wire strappers and other small hand tools needed to place wiring on the boat.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements although employers prefer at least grammar school education. Any shop courses taken will help give the worker a better background.

Training: Will start out as an apprentice electrician and work until he becomes an electrician. At this point, the worker may specialize in electrical work aboard boats.

PHYSICAL DEMANDS AND WORKING CONDITIONS

Most of the work is performed inside the boat although connecting decks, lights, radio antenna, etc., require working outside the boat. The worker is subject to no immediate hazards. Must possess average physical strength and endurance to crawl throughout the boat stringing wiring and carrying pieces of electronic equipment.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitudes in motor coordination and manual dexterity. Must be able to visualize from a blueprint the layout of wiring aboard the vessel.

Temperament: Must be able to work well without supervision and be even tempered and a conscientious worker.

CHANCES FOR PROMOTION

Has about reached his limit.

PURCHASING AGENT

OCCUPATIONAL DESCRIPTION

Reads the list of needed materials and specifications from the ship designer or architect. Uses price books and calculators to figure out the total cost of the repair job or the new boat to be built. Enters the item by item price on a bid or estimate sheet and provides the customers with a copy. Orders parts by phone or mail. When parts are received will check to see that the order is complete, that the prices are correct and place them in the stockroom or send them to the proper worker; i.e., electrician, mechanic, etc.

EQUIPMENT

Electronic calculator, adding machine, price books, phone

MINIMUM QUALIFICATIONS

Education: No specific educational requirements. Shop courses in electric, metal, wood and mechanical drawing would be of some help.
Training: Usually started as a worker at some other job in the company and became familiar with the business and the parts and equipment used.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed inside and under quiet conditions. The worker is subject to no immediate hazards and needs no specific physical qualifications.

WORKER CHARACTERISTICS

Aptitudes: Average aptitudes in math
Temperament: Must be able to work well with customers who demand quick service and with workers who need parts so they can get the job done. Must be aware of where to obtain hard-to-get parts.

CHANCES FOR PROMOTION

Has about reached his limit.

SECRETARY

OCCUPATIONAL DESCRIPTION

Perform the functions of typist and receptionist for the fishing industry. Makes out order forms and double checks the pricing of invoices, delivery orders and invoices on ordered stock.

EQUIPMENT

Must be able to use a calculator, typewriter and various other office machines.

MINIMUM QUALIFICATIONS

Education: Employer prefers a high school diploma.
Training: Should have some typing and secretarial training. Will get on the job training for skills required for this particular job.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed inside under quiet conditions. The worker is subject to no immediate hazard.

WORKER CHARACTERISTICS

Aptitudes: Above average motor coordination, manual dexterity and eye-hand coordination. Must enjoy working indoors at a desk job.
Temperament: Must be even tempered, pleasant, and helpful.

CHANCES FOR PROMOTION

May be promoted to Executive Secretary or Office Manager if there is such a person in this organization.

BOOKKEEPER

OCCUPATIONAL DESCRIPTION

The worker keeps a record of all the sales the clerks have made and the money that comes in. She makes up the bills and charges the accounts. She also pays the bills for stock the company orders from the manufacturers. She operates a bookkeeping machine, typewriter, various office machines.

EQUIPMENT

Bookkeeping machine, various office machines.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements although the employer prefers a high school diploma. Must have a basic educational background in bookkeeping techniques as well as a secretarial training.
Training: Will get on the job training for techniques used in this type of business.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed inside under quiet conditions. The worker is subject to no immediate hazards.

WORKER CHARACTERISTICS

Aptitudes: Above average aptitudes in motor coordination, manual dexterity and eye-hand coordination. Must be able to operate efficiently and accurately all types of business machines and be quick with figures.
Temperament: Must be able to work under conditions of stress caused by many mathematical figures. Must be a well organized person, and an accurate person.

CHANCES FOR PROMOTION

Has reached limit.

STRINGER

OCCUPATIONAL DESCRIPTION

Takes the spat or oyster seed, and a planting stick and some wire. Places the wire through a hole in the shell and a hole in the stick thus wiring the shell to the planting stick. Places three of these shells per stick. Then places the laden stick into the box. When the box is full, takes it to the water in the slough and places it in to keep the oysters alive until they can be planted at low tide. May punch a hole in the shell if there is none.

EQUIPMENT

Planting sticks, wire, spat and a punch.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements.
Training: Will get on the job training in the method of stringing used at the farm.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed outside in the weather or under cover if it is raining. The work is done in quiet conditions and the worker is subject to no immediate hazards. The worker must possess average physical strength and endurance.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.
Temperament: Must be able to work quickly and efficiently without being under direct supervision.

CHANCES FOR PROMOTION

This is a part time job. It is one of the beginning jobs at the oyster farm. Usually performed by children, the worker may be promoted to some other job at the farm if he shows a willingness to work hard and learn the business.

LABORER: OYSTER FARM

OCCUPATIONAL DESCRIPTION

May do any of various assigned jobs around the plant. Can use the clippers to cut the oysters from the planting sticks and place them in the boxes. Can take these boxes of oysters into the plant. Can help load the boxes onto the barge before and during the harvesting process. Can help with the clean up around the plant and help load the delivery truck taking the oysters to the consumer.

EQUIPMENT

Clippers, rain gear, and any other tools necessary to do the assigned job.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements.
Training: Will get on the job training in the methods used at the farm.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed inside and out in the weather under quiet conditions. The worker should have above average physical strength and endurance to do any assigned tasks.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.
Temperament: Must be able to work at assigned tasks without direct supervision.

CHANCES FOR PROMOTION

This is only a part time job. If he shows a willingness to learn the industry he may become a shucker the following year.

LABORER: SHIPBUILDING YARD

OCCUPATIONAL DESCRIPTION

These workers may do anything from clean up, sand blasting, the metal or high pressure spraying it in preparation for painting, to apprentice jobs in welding, machine work, carpentry and painting. They may fill in for sick workers in any position in the business if they have attempted to learn the job. May run the crane for lifting heavy machines.

EQUIPMENT

WIll range from a broom to any equipment used in the various jobs within the company.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements. Shop courses in metal, wood, electrical and mechanical drawing would help the laborer work more quickly into a more responsible position.

Training: Will get on the job training through observation and experience in methods used by that company.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work may be performed inside or out depending on what his assignment is. Hazards may range from none to those involved in the most hazardous jobs. Physical strength and endurance of the worker should be at least average.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitudes in motor coordination and manual dexterity.

Temperament: Should possess a real desire to learn and be a fast efficient worker, capable of working well and learning under direct supervision.

CHANCES FOR PROMOTION

For a good conscientious worker who is willing to learn, he could be promoted to helper or apprentice on any of the jobs in the business.

MACHINIST

OCCUPATIONAL DESCRIPTION

Inside Machinist

Reads blueprints to see how shafts, couplings, gears, winch plates, are made. Uses equipment to make these items according to specifications. May also install the diesel engines and all drive mechanisms in the boat, making sure they are all mounted and aligned properly. May build control type components for the engine and/or build adapters or modify commercially built parts to fit that particular boat or engine. In general, makes the fittings used to hook up the various pieces of equipment on the boat.

Outside Machinist

Installs shafts, hydraulic systems and other equipment aboard the boat which were made or modified by the inside machinist. Also may do diesel engine and hydraulic system repairs. May use a crane to move heavy pieces of metal and equipment aboard the boat.

EQUIPMENT

Lathes, shapers, mills (cuts to tolerance of 1000th of an inch), drill press.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements. Must be able to read blueprints. Any shop courses in machine tooling and mechanical drawing will help.

Training: Gets on the job training in the methods used in that industry.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed both inside the shop and outside in the weather. The worker is subject to hazards from heavy pieces of metal shifting and falling or small pieces of metal shavings being lodged in the eyes. The worker must possess above average physical strength and endurance to move and work on heavy pieces of metal and maneuver large engines and shafts into alignment.

WORKER CHARACTERISTICS

Aptitudes: Must possess above average aptitude in motor coordination and manual dexterity. Ability to use and determine small measurements and desire for exactness in work.

TEMPERAMENT: Must be even tempered and patient to work with such exacting measurements all the time.

CHANCES FOR PROMOTION

If the worker shows a desire to work and learn the job well, could be promoted to head machirist.

PAINTER

OCCUPATIONAL DESCRIPTION

Prepares the metal and wood for painting by sanding sand blasting or use of high pressure water spray (on hull). Uses airless spray gun to place both primer and outer coats on the large areas to be painted or applies paint with brush to small areas.

EQUIPMENT

Airless spray gun, burshes, paint, paint thinners, face masks and sand blaster.

MINIMUM QUALIFICATIONS

Educational: No specific educational requirements.
Training: Will get on the job training in the methods used by that company.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is done both inside the boat and shop and outside. The worker is subject to hazards of paint fumes and spray and working on scaffolding. Must possess average physical strength and endurance.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitudes in motor coordination and manual dexterity.
Temperament: Must be willing to work well when not under direct supervision.

CHANCES FOR PROMOTION

Has reached his limit.

PIPE FITTER

OCCUPATIONAL DESCRIPTION

Places all pipes on a boat (when being built new) and welds, solders or joints them together and fastens them in place. Reads a blueprint and visualizes where each pipe should go and where its route will cause the least interference with other piping systems (such as hydraulic, electrical, plumbing, refrigeration, etc.) Lays out pipe and makes all couplings, joints and sleeves necessary to connect the pipes. May use plastic pipe on the hot and cold water systems because of ease of installation.

EQUIPMENT

Oxygen acetylene torch, gloves, electric welding machines, welding rods and various small hand tools. May wear rain gear if working outside.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements, although employers prefer at least grammar school education. Any shop courses taken in school will help as the fitter must be able to read blueprints and follow their instructions.

Training: Will get on the job training in the methods used in pipe fitting aboard the boat.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed mostly inside the shop or the boat. The worker is subject to hazards from falling objects. Must possess above average physical strength and endurance for moving pipes and fixtures around the boat and for moving around inside the boat with pipes and equipment.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.

Temperament: Must be even tempered, able to work with others, and deal with the boat owners. Must be able to work without direct supervision and follow orders.

CHANCE FOR PROMOTION

If he showed a willingness to learn and work hard to learn that portion of the industry, could be promoted to foreman of the pipe fitters.

PLANTER

OCCUPATIONAL DESCRIPTION

May help take the boxes of strung planting sticks out of the water and load them on the barge. May help unload the boxes into the smaller boats. Takes the planting stick out of the box and pushes it into the mud of the bed.

EQUIPMENT

Hip boots, rain gear, gloves and planting sticks.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements.
Training: Will get on the job training in the methods used by that company.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed outside under quiet conditions and in the weather. The worker must have above average physical strength and endurance to lift the boxes, push the stakes into the mud and walk around in shallow water and mud.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.
Temperament: Must be able to work at tasks without direct supervision.

CHANCES FOR PROMOTION

This is only a part time job. May be handled by the owner of the oyster farm.

WELDER AND SHIP FITTER

OCCUPATIONAL DESCRIPTION

Ship Fitter

Reads blueprints and makes patterns from these. Then cuts the parts out and assembles them tacking it all together ready for the finish welders to come along and weld the structure together.

Welder

Takes these preassembled parts and welds them together to make the boat, uses a welding torch to weld, cut and form the large plates of metal sheets to the desired form.

Specialty Welder

Cuts out, welds and polishes smaller parts of the ship which are made out of aluminum, stainless steel or other exotic metals. Takes a certain degree of artistic ability and a high degree of proficiency in welding technique. Examples of items fabricated could be throttle control, galley sink, deck winch base and drums.

EQUIPMENT

Oxygen acetylene torch, gloves, electric welding machine, welding rods and various small hand tools. Sometimes wears rain gear as he is working out of doors. Power grinder, chalk rulers, compasses.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements, although employers prefer at least grammar school education. Must be able to read blueprints. Any shop courses taken in school will be of help.

Training: Will get on the job training in the methods of welding used in the boat building yard.

PHYSICAL DEMANDS AND WORKING CONDITIONS

The work is performed both inside and out of the shop: both inside and out of the boat. The worker is subject to hazards of heavy falling pieces of metal. Must possess above average physical strength and endurance for moving large pieces of metal and equipment around and over the whole boat as well as good legs for climbing around the boat.

WORKER CHARACTERISTICS

Aptitudes: Must possess average aptitude in motor coordination and manual dexterity.

Temperament: Must be even tempered and a steady worker willing to do his best job at all times though not under direct supervision.

CHANCES FOR PROMOTION

Can be promoted to specialty welder if he shows a willingness to work and learn that part of the trade and has some artistic ability or may be promoted to welding foreman.

YARD FOREMAN

OCCUPATIONAL DESCRIPTION

Schedules in all work so that the boat will not be out of operation for longer than necessary to do the repairs. Assigns different workers to do specific repair or building jobs and sees that necessary parts of materials are ordered by the purchasing agent. May help any other worker do their work if they have problems. Must be able to tell a customer where the problem lies with his boat and provide an estimate on how much the repairs will cost.

EQUIPMENT

No special equipment necessary to perform this job.

MINIMUM QUALIFICATIONS

Education: No specific educational requirements. Shop courses of all types will better prepare the worker for this job.
Training: Will gain on the job experience by working at various jobs in the company.

PHYSICAL DEMANDS AND WORKING CONDITIONS

Since the foreman should be able to do what all other workers do, he should have above average physical strength and endurance. When helping do others' work, he is subject to the hazards of that job. His work is performed both inside and out in the weather.

WORKER CHARACTERISTICS

Aptitudes: Should have above average aptitudes in motor coordination and manual dexterity.
Temperament: Must be able to instruct others in their work and get along with the customers.

CHANCES FOR PROMOTION

He is about as high as he can go unless he wishes to become a purchasing agent.